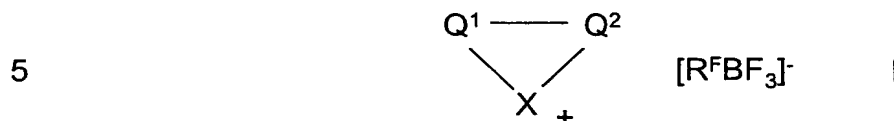


# Patent Claims

## 1. Compounds of the formula I



in which

X denotes  $\text{NR}^1$  or  $\text{N}(\text{R}^1)_2$ ,

10  $-\text{Q}^1-\text{Q}^2-$  denotes  $-\text{CHR}^3-\text{CHR}^4-\text{CHR}^5-\text{CHR}^6$ ,  
 $-\text{CR}^2=\text{CR}^3-\text{CR}^4=\text{CR}^5-\text{CR}^6=$  or  
 $-\text{CR}^7=\text{CR}^8-\text{NR}^{10}-\text{CR}^9=$ ,

$\text{R}^1$  in each case, independently of one another, denotes alkyl having 1-10 C atoms or  $-(\text{CH}_2)-\text{R}^{11}$ ,

$\text{R}^2-\text{R}^6$  denote hydrogen or alkyl having 1-10 C atoms,

15  $\text{R}^7-\text{R}^9$  denote hydrogen, alkyl having 1-10 C atoms or aryl,

$\text{R}^{10}$  denotes alkyl having 2-8 C atoms or  $-(\text{CH}_2)-\text{R}^{11}$ ,

$\text{R}^{11}$  denotes perfluorinated or partially fluorinated alkyl having 1-8 C atoms,

$\text{R}^{\text{F}}$  denotes perfluorinated alkyl having 2-8 C atoms, and

20 aryl denotes phenyl, perfluorinated phenyl, or phenyl or perfluorinated phenyl which is substituted by alkyl having 1-8 C atoms,

where the compounds

1-methyl-3-ethylimidazolium pentafluoroethyltrifluoroborate, 1-methyl-3-ethylimidazolium (n-heptafluoropropyl)trifluoroborate and 1-methyl-3-ethylimidazolium (n-nonafluorobutyl)trifluoroborate are excluded.

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2. Compounds according to Claim 1, characterised in that  $-\text{Q}^1-\text{Q}^2-$  denotes  $-\text{CHR}^3-\text{CHR}^4-\text{CHR}^5-\text{CHR}^6$ .

30 3. Compounds according to Claim 1 or 2, characterised in that the substituents  $\text{R}^1$  are different.

4. Compounds according to Claim 1, characterised in that  $-Q^1-Q^2-$  denotes  $-CR^2=CR^3-CR^4=CR^5-CR^6=$ .
- 5 5. Compounds according to Claim 1, characterised in that  $-Q^1-Q^2-$  denotes  $-CR^7=CR^8-NR^{10}-CR^9=$ .
6. Compounds according to Claim 1 or 5, characterised in that the substituents  $R^1$  and  $R^{10}$  in the formula I are different.
- 10 7. Compounds according to one or more of Claims 1 to 6, characterised in that  $R^F$  denotes perfluoroethyl, perfluoropropyl or perfluorobutyl.
8. Compounds according to Claim 1:  
N-methyl-N-butylpyrrolidinium pentafluoroethyltrifluoroborate,  
15 N-methyl-N-hexylpyrrolidinium pentafluoroethyltrifluoroborate,  
N-methyl-N-octylpyrrolidinium pentafluoroethyltrifluoroborate,  
1-methyl-3-butylimidazolium pentafluoroethyltrifluoroborate,  
1-methyl-3-hexylimidazolium pentafluoroethyltrifluoroborate,  
or 1,2-dimethyl-3-butylimidazolium pentafluoroethyltrifluoroborate.
- 20 9. Process for the preparation of compounds according to one or more of Claims 1 to 8, characterised in that  
in the first step, a compound of the formula II
- $$(R^F)_3P=NSi(R^{12})_3 \quad II,$$
- 25 in which  
 $R^F$  in each case, independently of one another, denotes perfluorinated alkyl having 2-8 C atoms, and  
 $R^{12}$  in each case, independently of one another, denotes alkyl having 1-8 C atoms, alkoxy having 1-8 C atoms, cycloalkyl having 3-7 C atoms,  
30 halogen or aryl,
- is reacted with a fluoride of the formula III

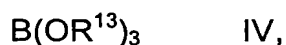


in which

M is ammonium, alkali metal or alkaline earth metal or a metal from group 11 or 12,

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and a boric acid ester of the formula IV

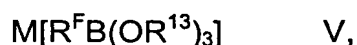


in which

$\text{R}^{13}$  in each case, independently of one another, denotes alkyl having 1-8 C atoms or aryl,

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and the resultant salt of the formula V



in which M,  $\text{R}^{\text{F}}$  and  $\text{R}^{13}$  have one of the above-mentioned meanings, is reacted, in the second step, with  $\text{HF}$ ,

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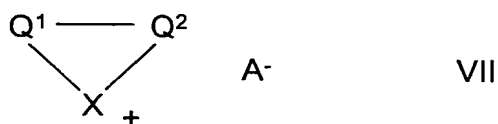
and the resultant salt of the formula VI



in which  $\text{R}^{\text{F}}$  is as defined above,

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is reacted, in the third step, with a compound of the formula VII



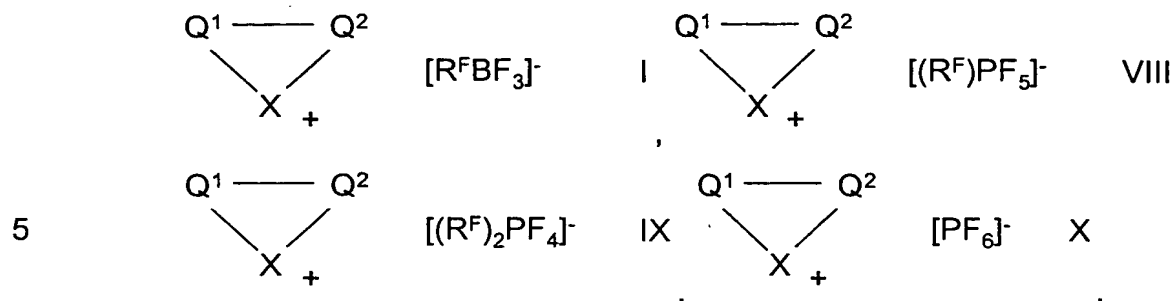
in which X and  $-\text{Q}^1-\text{Q}^2-$  are as defined for the formula I in Claims 1 to 6, and

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$\text{A}^-$  denotes alkylsulfate, alkylsulfonate, trifluoromethanesulfonate, tetrafluoroborate, acetate, trifluoroacetate, bis(perfluoroalkyl)phosphinate,  $\text{F}^-$ ,  $\text{HF}_2^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$  or  $\text{I}^-$ .

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10. Mixture of the salts of the formula I with salts of the formulae VIII, IX and X.



where

X,  $-Q^1-Q^2-$  and  $R^F$  have the meaning indicated in Claim 1 or in Claims 2 to 7.

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11. Mixture according to Claim 10, characterised in that it comprises 50-75 mol% of compounds of the formula I and 25-50 mol% of compounds of the formulae VIII, IX and/or X, where X,  $-Q^1-Q^2-$  and  $R^F$  have the meaning indicated in Claim 1 or in Claims 2 to 7.

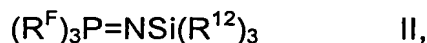
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12. Use of the compounds according to one or more of Claims 1-8 as ionic liquids.

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13. Use of the mixture according to Claim 10 or 11 as ionic liquid.

14. Compounds of the formula II



in which

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$R^F$  in each case, independently of one another, denotes perfluorinated alkyl having 1-8 C atoms, and

$R^{12}$  in each case, independently of one another, denotes alkyl having 1-8 C atoms, alkoxy having 1-8 C atoms, cycloalkyl having 3-7 C atoms, halogen or aryl.

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15. Compounds according to Claim 14, characterised in that  $R^F$  denotes perfluorinated  $C_1-C_4$ -alkyl.

16. Compounds according to Claim 14 or 15, characterised in that all three substituents  $R^F$  are identical.

5 17. Compounds according to one or more of Claims 14 to 16, characterised in that  $R^{12}$  in each case, independently of one another, denotes alkyl having 1-8 C atoms.

18. Use of the compounds of Claims 14 to 17 as alkylating reagents.

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